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Joint Photographic Intelligence Report

**PRECISE LOCATIONS OF
HERRINGBONE SAM SITES
IN THE MOSCOW AREA**



ARMY



NAVY



CIA

**PIC/JR-30/59
DECEMBER 1959**

Declass Review by NIMA / DoD

**CENTRAL INTELLIGENCE AGENCY
PHOTOGRAPHIC INTELLIGENCE CENTER**

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PREFACE

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This Joint Photographic Intelligence Report has been prepared by the Army, Navy, and the Central Intelligence Agency in partial response to Army SRI 422-1-57. Since a number of comprehensive reports on the Moscow SAM system already provide detailed information on the operational capabilities and functions of individual sites, it is the intent of this report to provide only more precise location and certain mensural data pertinent to the individual herringbone launching sites which had been located as of [REDACTED]. No attempt has been made in this report to predict the locations of sites not found on photography.

Photography used in the preparation of this report includes [REDACTED] all of which were used both to confirm locations of sites found in other sources and to locate sites previously unidentified. It should be noted that the location map used in this report provides only a general location of the sites discussed, whereas the tabular material provides detailed, accurate positioning data.

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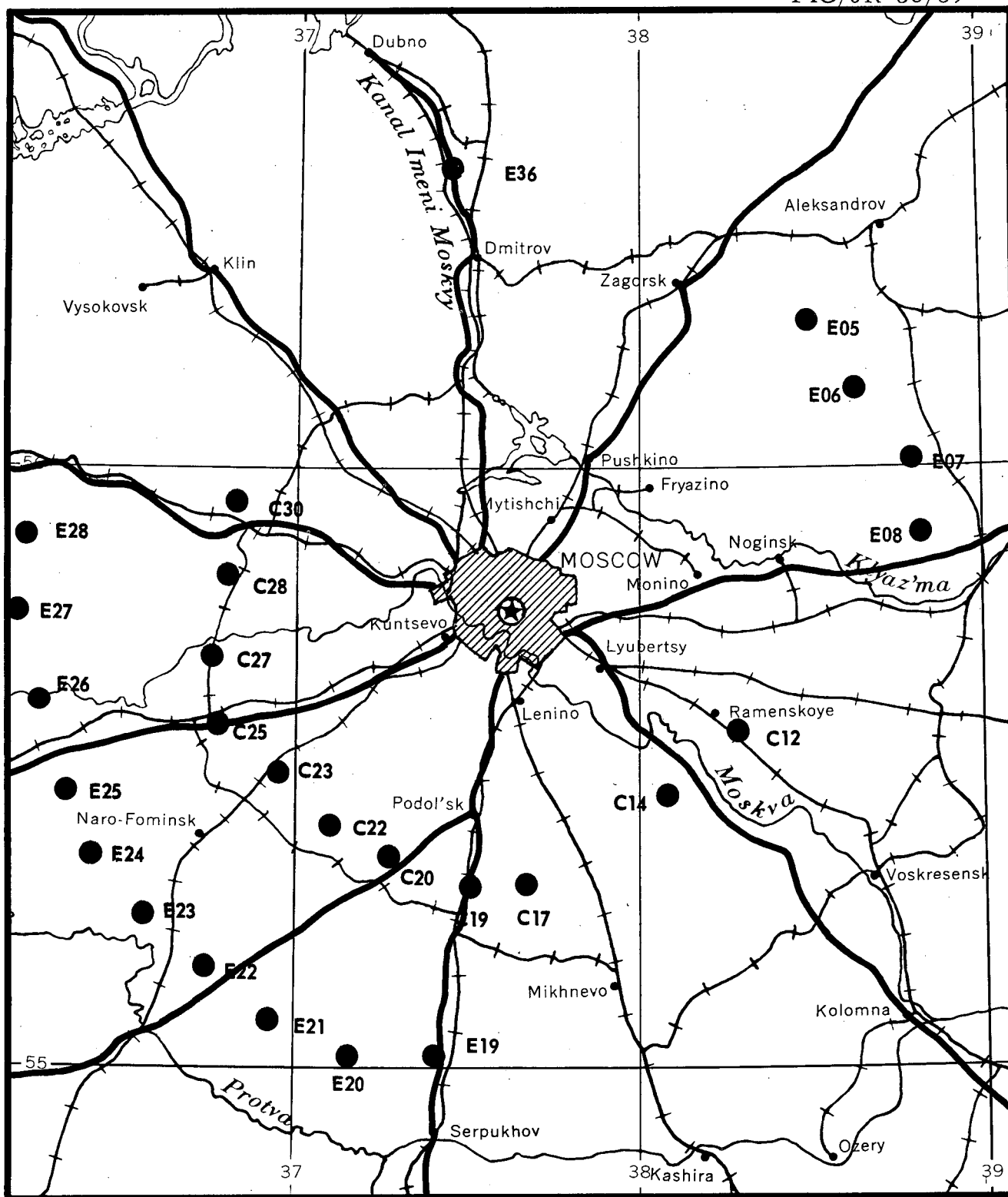
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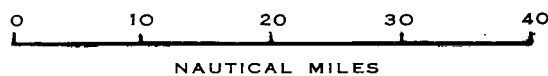
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FIGURE 1. LOCATIONS OF MOSCOW SAM SITES IDENTIFIED ON PHOTOGRAPHY.



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I. INTRODUCTION

This report consolidates and summarizes certain information obtained from all aerial photography prior to [] covering the herringbone-type surface-to-air missile (SAM) launching sites in the Moscow area. It specifically provides accurate geographic coordinates for each SAM site and its accompanying Yo-Yo radar and certain pertinent mensural data for each site. As of [] the precise locations of 26 launch sites have been verified on the basis of aerial photography and are discussed herein. Two other sites which appeared on photography could not be precisely located. Their tentative locations are also included in this report.

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Data discussed in this report are presented primarily in a tabular form. While the location map depicts the general location of the sites which have been identified and located, the precise location, certain mensural data, and source material used in the study of each site are set forth in tabular form. In addition, photography of two sites, with accompanying line drawings, is included to illustrate the methods employed in locating points of reference for the mensural data presented.

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II. METHODOLOGY

Of the 26 surface-to-air missile sites precisely located as of [] [] 18 were identified on [] This mission included good coverage of the southwest and northeast quadrants of the two concentric rings of SAM sites around Moscow comprising the launching facilities of the B-200 system. Cloud cover precluded obtaining photographic evidence of at least three other sites which are probably located in the inner ring northeast of the city, and which have not yet been photographed. Four other sites were located in the outer ring southwest of Moscow from [] mission coverage of [] The four remaining sites precisely located were photographed [] around Moscow. In addition, two other sites

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were identified [] but haze and obliquity of the photography, together with a lack of sufficient collateral material, precluded giving precise locations to these sites.

The points of reference used for the coordinates and measurements were located geographically by matching photographic detail to map detail and/or World War II photography. When available, Soviet maps were used to match detail, since the portrayal of vegetation and drainage thereon proved more accurate than on the majority of U. S. maps. The resultant coordinates were then adjusted from the Pulkovo to the European Reference Datum.

The coordinates for each SAM site are of the center of the launching area, which is a point where a line connecting the two central control bunkers would intersect the center service road. This method of location was possible only with respect to those sites where the over-all layout of the herringbone launching area conformed to a typical pattern. Figure 1, a photograph of Launch Site E-25, together with Figure 2, a line drawing of the same site, illustrate this method. The configuration of the majority of the sites permitted this treatment.

Because of the necessity for locating launch sites at fixed intervals, however, the configuration of a number of sites was affected by terrain features and drainage patterns to the extent that they could not be constructed symmetrically. In these instances the center of the launching area was determined by locating the third control bunker from the Yo-Yo radar end of the launching area and constructing a line through that bunker perpendicular to the center service road. Where the center service road also deviated from the typical pattern, it was projected as if it were a normal pattern and the perpendicular was constructed through the third control bunker. Figure 3, a photograph of Launch Site C-20, together with Figure 4, a line drawing of the same site, illustrate this situation.

The two sites which could not be precisely located are probably Launch Site E-01, in the vicinity of 56°28'N/37°42'E, and Launch Site C-35, in the vicinity of 56°12'N/39°30'E.

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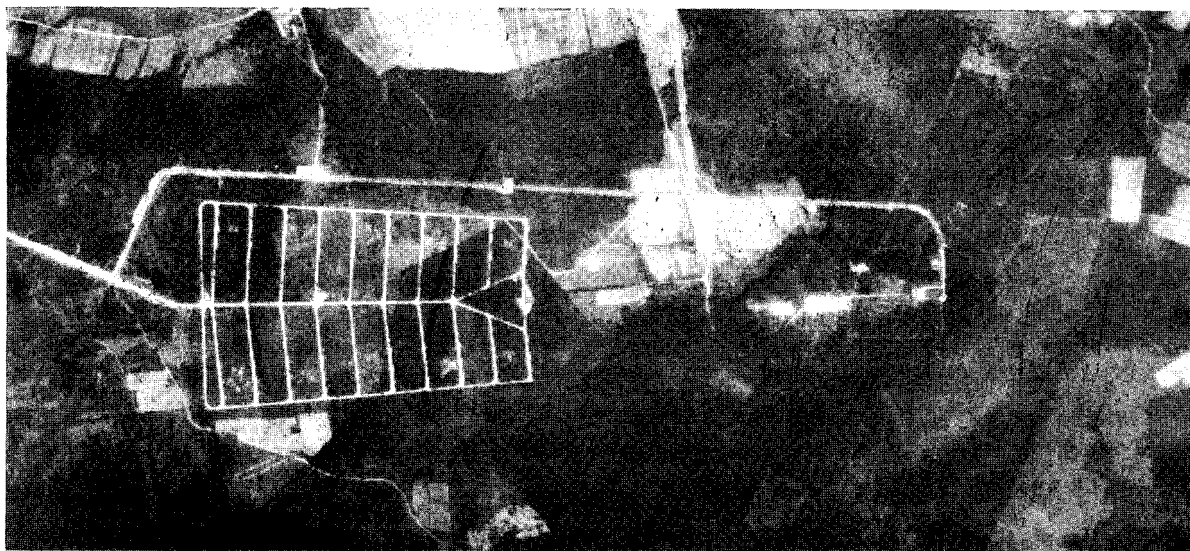


FIGURE 2. TYPICAL HERRINGBONE LAUNCH SITE. (SITE E-25)

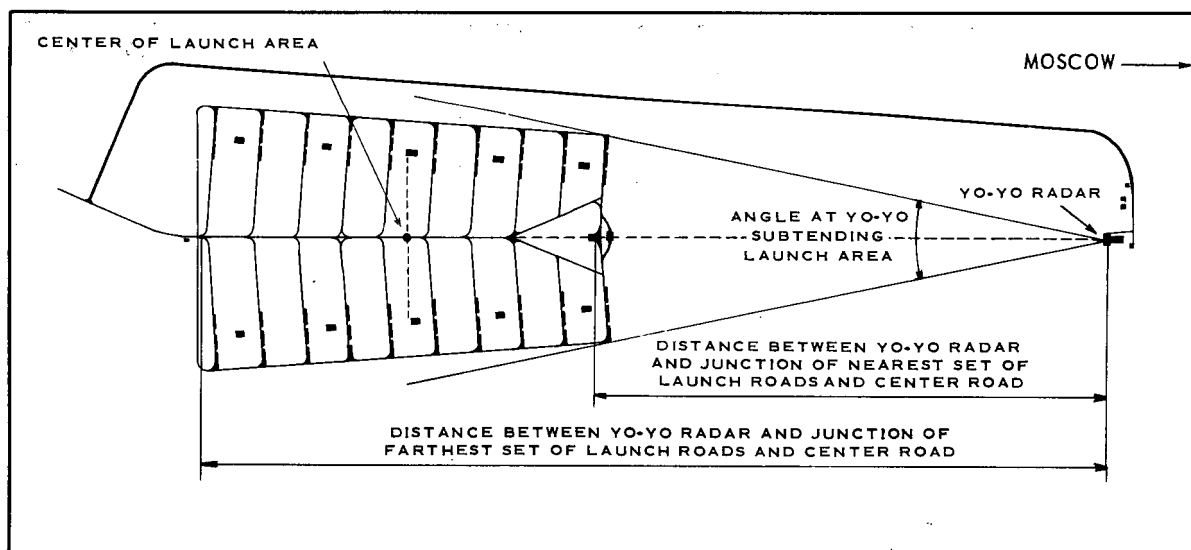


FIGURE 3. TYPICAL HERRINGBONE LAUNCH SITE. This line drawing illustrates the points of reference used to obtain the measurements and geographic coordinates of the Moscow SAM sites listed in the table.

Coordinates given for each Yo-Yo radar are based on the center of mass of the instrument, or the center of the forward portion of the Yo-Yo bunker when the radar antenna itself was not visible.

The distance was measured from the Yo-Yo radar to the intersection of the set of launch roads nearest the Yo-Yo radar with the center service

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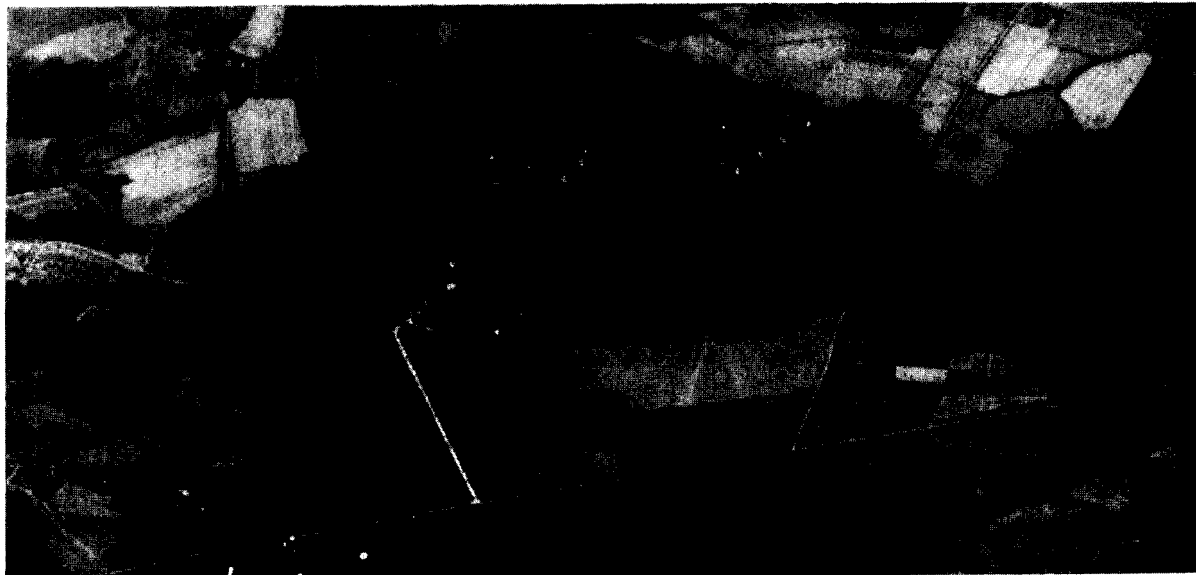


FIGURE 4. IRREGULAR HERRINGBONE LAUNCH SITE (SITE C-20)

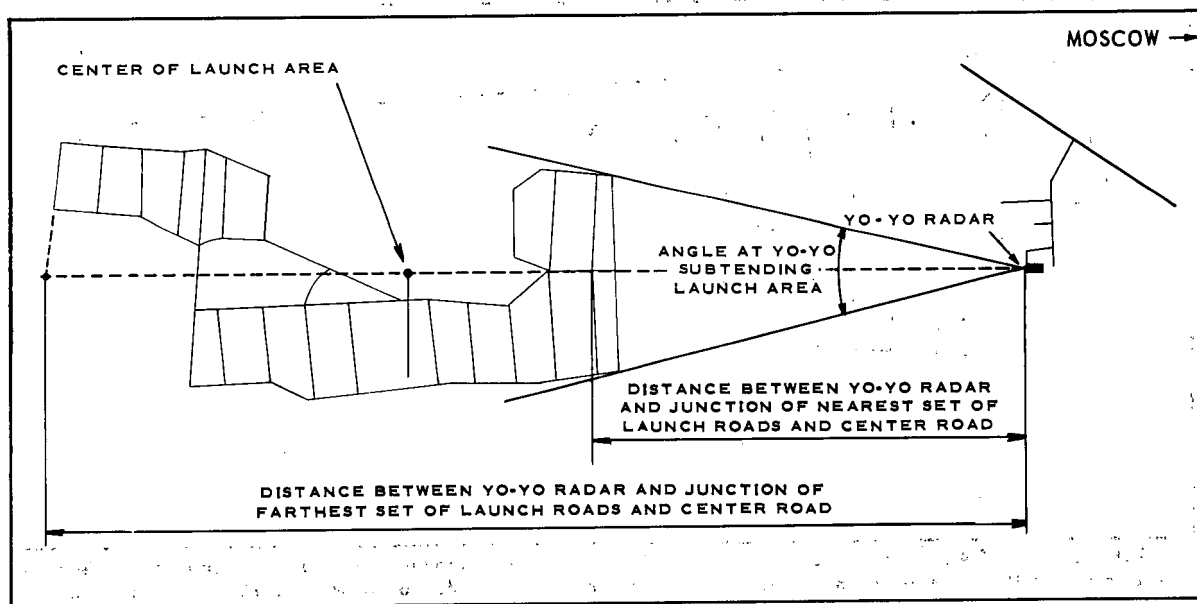


FIGURE 5. IRREGULAR HERRINGBONE LAUNCH SITE. This line drawing illustrates the points of reference used to obtain the measurements and geographic coordinates of the Moscow SAM sites listed in the table.

road, in the case of the typical herringbone sites, or to the intersection of the projection of one or both of these roads where the pattern was irregular. A second measurement was made from the Yo-Yo radar to the launch road, or the projection thereof, farthest from the Yo-Yo radar.

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III. SPECIFIC LOCATIONS OF HERRINGBONE SAM LAUNCH SITES IN THE MOSCOW AREA

The precise location, mensural data requested in Army SRI 422-1-57, and source material are presented in the table on the following two pages. In addition to the standard designation system for the Moscow SAM sites, two previously used designation systems have been included in the table to facilitate convenient use.

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SPECIFIC LOCATIONS OF HERRINGBONE

SITE NO.*	COORDINATES OF LAUNCH SITE**	COORDINATES OF YO-YO RADAR**	DISTANCE FROM YO-YO TO A POINT EQUIDISTANT BE- TWEEN THE FIRST SET OF LAUNCH PADS**
C-12 (1MISE-2) (40)	55° 32' 55" N / 38° 23' 21" E	CLOUDS	---
C-14 (1MISE-3) (44)	55° 27' 49" N / 38° 09' 01" E	55° 28' 44" N / 38° 07' 27" E	5475'
C-17 (1MISE-5-) (48)	55° 18' 43" N / 37° 45' 56" E	55° 19' 59" N / 37° 45' 11" E	---
C-19 (1MISW-1) (2)	55° 17' 50" N / 37° 36' 54" E	55° 19' 31" N / 37° 37' 06" E	---
C-20 (1MISW-2) (4)	55° 20' 31" N / 37° 21' 55" E	55° 21' 43" N / 37° 22' 31" E	---
C-22 (1MISW-3) (6)	55° 23' 03" N / 37° 10' 35" E	55° 24' 04" N / 37° 11' 43" E	---
C-23 (1MISW-4) (8)	55° 28' 05" N / 37° 00' 23" E	55° 28' 54" N / 37° 02' 05" E	---
C-25 (1MISW-5) (10)	55° 34' 39" N / 36° 52' 35" E	55° 35' 08" N / 36° 54' 32" E	5135'
C-27 (1MISW-6) (12)	55° 41' 06" N / 36° 50' 03" E	55° 41' 17" N / 36° 52' 11" E	5300'
C-28 (1MINW-1) (14)	55° 48' 59" N / 36° 52' 07" E	55° 48' 51" N / 36° 54' 17" E	5250'
C-30 (1MINW-2) (16)	55° 56' 26" N / 36° 55' 05" E	NO PHOTO COVERAGE	---
E-05 (1MONE-5) (45)	56° 14' 14" N / 38° 34' 14" E	NO PHOTO COVERAGE	---
E-06 (1MONE-6) (47)	56° 07' 07" N / 38° 42' 43" E	***	---
E-07 (1MONE-7) (49)	56° 01' 11" N / 38° 52' 00" E	CLOUDS	---
E-08 (1MONE-8) (51)	55° 53' 19" N / 38° 54' 52" E	55° 53' 12" N / 38° 52' 28" E	5000'
E-19 (1MOSW-1) (1)	55° 00' 37" N / 37° 30' 02" E	55° 01' 35" N / 37° 30' 02" E	4000'***
E-20 (1MOSW-2) (3)	55° 00' 32" N / 37° 14' 27" E	55° 01' 47" N / 37° 14' 43" E	4900'***
E-21 (1MOSW-3) (5)	55° 04' 25" N / 37° 01' 13" E	55° 05' 39" N / 37° 02' 25" E	5600'
E-22 (1MOSW-4) (7)	55° 08' 52" N / 36° 50' 41" E	55° 09' 48" N / 36° 52' 06" E	5000'***
E-23 (1MOSW-5) (9)	****	55° 15' 20" N / 36° 39' 43" E	---
E-24 (1MOSW-6) (11)	55° 21' 14" N / 36° 29' 23" E	55° 21' 40" N / 36° 31' 21" E	4925'
E-25 (1MOSW-7) (13)	55° 27' 54" N / 36° 24' 27" E	55° 28' 21" N / 36° 26' 31" E	5475'
E-26 (1MOSW-8) (15)	55° 36' 46" N / 36° 19' 21" E	55° 37' 00" N / 36° 21' 26" E	5350'
E-27 (1MOSW-9) (17)	55° 44' 25" N / 36° 16' 00" E	NO PHOTO COVERAGE	---
E-28 (1MONW-1) (19)	55° 52' 27" N / 36° 17' 48" E	55° 52' 16" N / 36° 19' 59" E	5200'
E-36 (1MONW-8) (35)	56° 29' 21" N / 37° 28' 19" E	56° 27' 55" N / 37° 28' 35" E	5700'***

*Sources for site designators: 1st column (C-12): AIN-SAGMOB/2C2-2-58; 2nd column (1MISE-2): AIN-SAGMOB/2C4-2-57; 3d column (40): SMR-1-56 (Army)

**See figures 3 and 5.

***Extreme haze and/or obliquity of photography precluded precise measurement or location. Dimensions are approximate.

****No photo coverage. Estimated coordinates are 55° 15' 18" N / 36° 36' 55" E, assuming typical configuration of launch site.

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